THE

DENTAL PRACTITIONER

Journal of Dental Science for the Practitioner

L. IV, NO. 9 MAY, 1954

[Incorporating the Proceedings of the British Society of Periodontology, and the Transactions of the British Society for the Study of Orthodontics]

CONTENTS

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THE

DENTAL PRACTITIONER

A Journal of Dental Science for the Practitioner

Vol. IV, No. 9 — May, 1954

EDITORIAL

THE JOURNAL

OLD readers of the Journal will note, some perhaps with sorrow, the change in our subtitle from "A Monthly Journal for the Practitioner and His Staff", to the new wording "A Journal of Dental Science for the Practitioner". Now each month the Journal will primarily be for the practitioner, although we feel sure it will still appeal to many members of his staff. The reason for this change has already been discussed in these columns, but we should like to reiterate our statement that the main articles will always be for the dental surgeon engaged in general practice. This does not by any means exclude all the other skilled specialists in the profession. The basic principles of dentistry are as essential to the specialist as they are to the general practitioner. Each branch of dentistry must learn from the other, and it is our endeavour each month to present a selection of topics covering a wide range of subjects. The journal is sent out to all parts of the world where our articles are read and abstracted into other journals. In the recent issue of *The Journal of the Western Society of Periodontology*, which is published in California, seven articles were abstracted from this journal. This is high praise both to the journal and to the standing of the British Society of Periodontology, and shows undoubtedly the wide distribution that contributors can count on when publishing in this journal.

GIBBS TRAVELLING SCHOLARSHIP

THE Second Gibbs Travelling Scholarship has been awarded to Mr. A. E. Parrott, L.D.S. R.C.S. (Eng.), the text of whose winning lecture to a lay audience is published in this issue. The Scholarship has been made possible by the generosity of Messrs. D. & W. Gibbs Ltd., and its administration has been in the hands of a Sub-Committee of the British Society of Periodontology.

The Scholarship will enable the winner to spend two months in the United States studying the dental health education of the public. His tour is being planned by Dr. Harold Hillenbrand, Secretary of the American Dental Association, and will cover a wide area of the country.

Mr. Parrott will be spending May and June in the States and will be reporting on his visit to the British Society of Periodontology during its Autumn session. His report will be published in due course in the DENTAL PRACTITIONER.

THE CHOICE OF IMPRESSION TRAYS AND TYPES OF SPECIAL TRAYS

By **G. G. T. TREGARTHEN**, M.D.S., F.D.S. R.C.S., and **J. F. BATES**, B.D.S.

University of Durham

THE foundation for an efficient denture prosthesis is an accurate impression recorded under the conditions considered desirable for a particular patient, e.g., compression, static, or a combination of static and compression (*Fig.* 1).

Further, the foundation for an impression should be a special tray designed to accommodate the particular impression material and to guide the distribution of that material within the mouth.

Fig. 1.—Combined tray prepared for pendulous tissue impression. Fitting and non-fitting surfaces.

We have noted over a period of years that even advanced students find more difficulty in selecting a correct tray for full denture prosthesis than in most other clinical procedures.

It is with this in mind that it has been thought worth while to review the selection of trays at our disposal and to describe a type of special tray which has been used most successfully in this school for a considerable number of years.

The ideal tray should:—

1. Be clean, smooth, and not undercut (when it is necessary to remove the tray from the impression while still in the mouth, e.g., with partial plaster impressions).

2. Have sufficient strength to meet the demands imposed on it.

3. Convey and hold the impression material in the correct position in the mouth.

4. Prevent distortion of the material during the setting or hardening and removal from the mouth.

5. Allow an even thickness of impression material over the whole denture-bearing area. The thickness required will vary with the impression material being used.

(Zinc oxide and eugenol pastes need a very thin film of about $\frac{1}{16}$ in., whilst plaster-of-Paris will vary as do other impression materials setting by crystallization:—

a. Straight plaster needs $\frac{1}{4}$ in.

b. Plaster wash in a compound impression $\frac{1}{32}$–$\frac{1}{16}$ in.

c. Those materials containing resins need only the minutest clearance owing to the tenacious adherence of the material to the tray without flaking.

Zelex or Tissuetex needs at least ¼ in. thickness. Should less clearance than this be permitted, these alginates will tear. It is essential that colloids be supported by the tray to prevent distortion.

Compounds need ¼ in. thickness, especially if a compression impression is being recorded. The tray can with advantage contain a small lip of metal on the fitting side of the tray about $\frac{1}{16}$ in. below the peripheral margin when recording impressions in Zelex, Tissuetex, or Dentocoll. This is similar to the tube on the water-cooled tray as employed when using Dentocoll, the object of this addition being to prevent distortion of the material. In the case of alginates a rim of compound is especially satisfactory).

6. Be clear of all moveable tissues at the periphery by about ⅛ in., and should not impinge on muscle attachments, fibrous bands, or fræna.

The upper tray should be extended ⅛ in. beyond the union of the hard and soft palate to allow for post damming.

7. Be capable of adaptibility so that it may be used more than once, be light to handle, and be suitable for all types of impression materials.

8. Be capable of being sterilized.

9. Be cheap, rapid, and easy to construct.

In practice the main advantage of an accurate tray and accurate impression is that the chairside time is reduced for each case, especially if any adjustments to the denture are necessary. One may readily assume that an adjustment may take 10–15 minutes, and an appreciable amount of time can be consumed in this way, making the denture an uneconomic proposition.

CLINICAL PROCEDURE TO ASSESS SUITABILITY OF TRAYS

The lower tray is inserted so that the heels are ¼ in. anterior to the retromolar pad. The anterior part of the tray is raised to touch the upper lip; by looking between the tray and lower ridge the peripheral and general shape of the tray can be assessed; now lower the anterior portion so that the tray provides ¼ in. clearance from all the tissues. The peripheral adaptation can be checked by manually raising the cheeks and lips, then asking the patient to raise and move the tongue.

The upper tray is next inserted, placing the heels over the tuberosities and depressing the tray until it touches the lower lip. Looking between the tray and the tissues the shape can be assessed; by raising the anterior portion the peripheral adaptation can be checked as in the case of the lower.

It would be well to emphasize that, whether a stock or special tray is to be used, it should be checked before recording the impression. This especially applies to the base-plate types of tray which are made by junior technicians too rapidly and with insufficient knowledge of their requirements. One should remember that the snap impressions usually recorded in composition are not always well produced and with little or no attempt at muscle trimming. The more accurate the initial impression the more suitable will be the final impression results.

TYPES OF IMPRESSION TRAY

The stock trays as supplied by the dental companies in a variety of shapes and sizes are made of German silver, aluminium, or stainless steel. They may be modified by bending, cutting, and stoning, or may be prepared for a particular impression material, e.g., Dentocoll, or as required for certain cases made more efficient by the addition of composition.

The stock trays at our disposal are frequently too rigid to be as readily adapted as one would wish, and the shapes available are not those which one sees most often in private practice. The handles are unnecessarily large, and, because they are more often than not badly positioned, interfere with muscle movement.

It is suggested that more successful impressions might be recorded if small handles clear of lip interference were used. For those who prefer no handles at all and for ease of conveying the loaded impression tray to the mouth a small piece of composition may be sealed to the tray over the crest of the alveolar ridge, so that it does not interfere with the tissues, but

is sufficiently large to hold between the finger and thumb.

SPECIAL TRAYS

These can be classified as follows:—

1. Metal.—

a. Cast—Lead or Tin or a Combination of Both.—The metal recovered from X-ray films makes excellent trays. All these trays can be cut or bent to the required shape readily, and, after their initial use, are serviceable for further cases, as they can be sterilized, and are extremely efficient irrespective of the impression material selected. The chief disadvantages are the time required to construct and polish the trays, and their weight. This may be overcome by adapting a slightly thinner wax prior to casting.

b. Swaged—German Silver, Aluminium, Lead, and Tin.—The most favoured metals are German silver and aluminium. The latter makes excellent trays, especially now that it is possible, in fact easy, to braze or solder handles to the tray. Their production is far simpler as neither metal dies nor counterdies are necessary. The swaging can be carried out on a stone-hard model (cast), using the rubber swaging block.

Both German silver and aluminium are very popular and commonly used in this school (*Figs.* 2, 3).

The great disadvantage is in the time and labour involved in producing the die and counterdie; with aluminium these factors ar considerably reduced.

The gauges for German silver are: 6 or (·016–·019 in.), and for aluminium: 22 or 1 (0·6–0·9 in.).

2. Non-metal.—

a. Processed Acrylic Resin Trays.—The technique is the same as used for the individual case, and may by heating and adaptation prove suitable for further use. In the Fournet-Tuller technique this type of tray made of the methyl methacrylate is decidedly suitable.

b. Swaged—Acrylic Resins.—In this technique a brush gas-oxygen flame is used. This is considered rather expensive to produce.

c. Vulcanite Trays.—This pioneer of denture materials is extremely satisfactory, and is still used with special impression techniques.

3. Base Plate.—These materials with shellac resin or aluminium contents are easily constructed, and may sometimes be used again.

The chief disadvantages are:—

1. If not strengthened they are prone to fracture.

2. They are suitable only for using with materials which set by the process of crystallization i.e., the sodium alginates, and zinc oxide pastes. Composition and Dentocoll are therefore excluded. Sterilization can only be partly effected.

The special tray described has been used successfully in this school for over fourteen years.

Fig. 2.—Upper swaged German silver tray contrasted with standard tray.

Fig. 3.—Lower swaged German silver tray contrasted with stock tray.

4. Compound.—Impression compound may be used in two ways as special trays:—

a. Adapting the material (which should be $\frac{1}{16}$ in. in thickness) to the cast (model) with sufficient clearance for corrective impression.

b. Selecting the most satisfactory tray possible, recording the impression in compound and, after removal from the mouth, cooling and hardening thoroughly. Then, by slightly heating the metal tray, the compound will separate easily from the tray. Any slight muscle trimming can then be carried out, as well as the necessary modifications, i.e., post-damming, and creating space for the plaster wash or other selected impression material.

5. Base Plate Gutta-percha.—Very serviceable trays can be constructed in similar manner in this material, but have these very marked advantages:—

a. May be used for a great number of cases.

b. Can be sterilized by boiling.

THE CONSTRUCTION OF A COMBINATION SOFT METAL AND SHELLAC BASE-PLATE SPECIAL TRAY

In the construction of this tray any of the shellac type base-plate materials are suitable. A sheet of base-plate is adapted to the cast after softening in boiling water or over the bunsen flame. The softened base-plate is adapted to the cast by means of a piece of chamois leather or erasing rubber in such a manner that a perfect fit is ensured.

The base-plate is now marked with a pencil at the estimated extremities of the peripheral margin, with due allowance made for muscles and the fræna. The base-plate is now removed from the cast and the surplus material on the outside of the pencil line trimmed off by means of a fret-saw or scissors after warming. Finally the margins are smoothed with sandpaper.

The base-plate is now re-adapted to the cast and checked for fit. This acts as a spacing piece over which the special tray is to be constructed; the thickness of the spacing piece or pieces is governed by the impression material which is to be used.

A second piece of base-plate is now softened in boiling water or over the bunsen flame and adapted over the spacing piece. If dry heat is used it is necessary to rub french chalk over the surface of the spacing piece to ensure easy separation.

The outline of the special tray is now drawn on the base-plate in pencil, and the surplus

Fig. 4.—Upper and lower endentulous special trays.

material on the outside of the pencil line is again cut away with a fretsaw or scissors. The edge of the tray is smoothed over with sandpaper, leaving the margins neatly fashioned.

The base-plate tray is now applied to the spacing piece, checked for fit and accuracy of extension, and then removed from the cast.

A piece of soft metal tinfoil 0·016 or 0·019 in. in thickness (gauge 6 or 7) is now swaged, by means of a curved rubber packer and a piece of chamois leather or erasing rubber, over the spacing piece on the cast.

The base-plate is now warmed and gently pressed into position over the soft metal. A line is drawn around the soft metal an eighth of an inch from the edge of the base-plate special tray. The base-plate tray and soft metal are now removed from the cast and the scissors are used to trim away the surplus metal from the line on the swaged metal base.

The soft metal and base-plate special tray are again placed over the spacing piece on the cast, and the margin is doubled back over the base-plate tray on the outside. It is then burnished into position with a rubber packer. (*Fig.* 4.)

A piece of gauge 7 German silver wire 3 in. long is now bent to form a round tray handle. The free ends of the handle which are to be attached to the tray are roughened and flattened. They are now warmed over a bunsen flame and seared into position on the base-plate tray so that the curved handle will point downwards and outwards of the mouth with an upper tray and upwards and outwards with a lower when an impression is being recorded. It is important to ensure the handle is so positioned as to allow for muscle trimming during the recording. Two small pieces of base-plate are now warmed over the bunsen flame, placed in position over the roughened handle ends on the base-plate tray, and heated with a wax knife so that they unite with the base-plate tray, forming a strong and clean union.

Any roughness on the special tray is now removed by means of a file and fine sandpaper. The base-plate is brush-flamed to give a smooth finish and the soft metal on the fitting side polished by vigorous rubbing with cotton-wool. The result is a very clean and strong special tray (*Fig.* 5).

Fig. 5.—Upper and lower special box trays.

Advantages of a Combination Base-plate and Soft Metal Tray.—These are:—

1. Ease of construction.
2. The soft metal and handle can be used many times for special trays and are limited in size only by the first special tray constructed.
3. With gentle warming, the tray can be adapted to any desired shape or size after its initial purpose is fulfilled.
4. The tray can be used with any type of impression material--composition, alginate, hydrocolloid, zinc oxide and eugenol, plaster-of-Paris, or base-plate gutta percha, etc.
5. This tray is not only ideal for the edentulous case but also achieves highly satisfactory results using the sectional technique. It is light, strong, and easy to handle.

REFERENCE

Tregarthen, G. G. T. (1951), "Pendulous Tissue in relation to Full Denture Prosthesis", *Dental Practit.*, 1, 376.

NEURALGIA CAUSED BY A ROOT WITHIN THE INFERIOR DENTAL CANAL

By **A. D. HITCHIN**, M.D.S., F.D.S. R.C.S.E., and **J. W. WHITE**, L.D.S. R.C.S. (Eng.)

Dundee Dental School, University of St. Andrews

This is a report on a case of neuralgia caused by the presence of a root, partially occluding the vessels and pressing on the mandibular nerve, within the inferior dental canal. It is surprising that so few cases of a similar nature have been reported, although roots often lie in close relationship to the canal and others embrace it, but do not actually lie within the canal itself. Breslin (1953) reported the "removal of a root in the mandibular canal", but in his case there was no paræsthesia either before or after operation. The possibility that the root was in a bone space at the side of the canal is not entirely excluded.

CASE REPORT

The patient, A. C., a man aged 65 years, attended the Oral Surgery Department at the Dundee Dental Hospital on Nov. 5, 1953. He complained of a severe neuralgic pain that started in the right side of the lower jaw and then spread over the whole of the right side of the head. This pain varied in severity from time to time, but never entirely disappeared.

He first noticed it about three days after a ride on the pillion of a motor-cycle on an extremely cold night in February, 1950. He unsuccessfully treated himself at home with hot and cold applications to the right side of his face.

At the end of this period he consulted his doctor and dental surgeon, who removed all his teeth under general anæsthesia. After this the right side of the patient's lower lip was anæsthetic for one week. Three weeks later the pain returned and the patient was referred

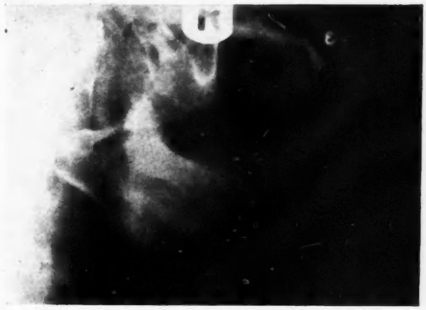

Fig. 1.—Right lateral oblique radiograph of mandible showing dilatation of canal and root present within it.

to his local hospital, where radiographs showed retained roots in the left side of the mandible.

Ten months later he was referred to the dental surgeon of a general hospital, who, having investigated the case, referred it to our clinic.

On Examination.—The patient was found to be edentulous; radiographs revealed, both in postero-anterior and lateral oblique films, a calcified mass lying in a dilatation of the inferior dental canal in the $\overline{8|}$ region (*Figs.* 1, 2).

At Operation.—Under endotracheal anæsthesia the area was exposed through an

incision in the 8| region and a window made with surgical burs down to the dilatation in the inferior alveolar canal. The calcified body was lifted out of the canal with dressing forceps. A longitudinal ground section demonstrated that this mass was a root (*Fig.* 3) with

Fig. 2.—Postero-anterior radiograph of skull showing root 8| inside the dilatation of mandibular canal on right side and retained roots |8.

the pulp chamber partly obliterated and areas of resorption of dentine with cellular cemental deposition around the apex. |8 root also removed.

The amount of hæmorrhage was conspicuously small, suggesting that the pressure of the root upon the vessels had led to their becoming thrombosed.

After operation the right lower lip was anæsthetic, but one week later sensation was beginning to return. He commented that this feeling was the same as he had experienced for a week following his previous extractions in 1950.

DISCUSSION

The dilatation in the canal shown in both postero-anterior and lateral oblique radiographs (*Fig.* 4), the operative findings, and the past history of anæsthesia provide in this

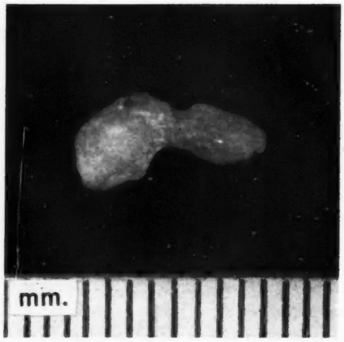

Fig. 3.—Root removed from inside canal.

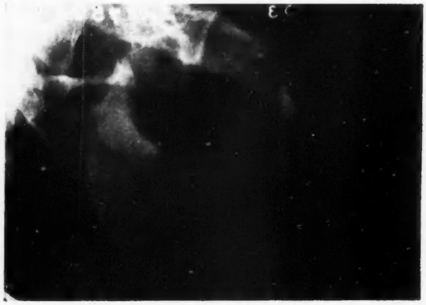

Fig. 4.—Post-operative right lateral oblique radiograph showing window in bone and dilatation of inferior alveolar canal with root removed.

case conclusive evidence that the root was actually inside the inferior alveolar canal.

SUMMARY

A case of intermittent neuralgic pain, with a history of anæsthesia of the lower lip due to a root within the inferior dental canal is described.

REFERENCE

Breslin, W. W. (1953), *J. Ont. dent. Ass.*, **30**, 102.

AN ORTHODONTIC CLASP

By J. S. BERESFORD, B.D.S. (N.Z.), H.D.D. (Ed.)

THE circumferential clasp and the Jackson crib are of limited service in the retention of orthodontic appliances. Where the gingival margin is high about the young tooth such clasps cannot be adapted to the buccal surface below the level of greatest circumference. In consequence retention is only weakened by tightening the clasp.

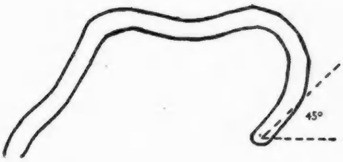

Fig. 1.—Diagram of the clasp viewed from the medial or distal side.

The labial or buccal surface of any tooth joins with the medial or distal surface along a line to the interproximal side of which will be found an "undercut" in all teeth except those which are markedly inclined. It is from this region that arrowhead and Adams cribs derive their retention.

The clasp here illustrated, which is not original, derives its retention in the same way. It is a simple end-bearing clasp of 0·8-mm. wire applied to one tooth at one point only. It is most readily adjusted if the terminal arm approaches the tooth at an angle of 45° to the vertical and horizontal planes, as in *Fig.* 1.

That arm of the clasp lying across the embrasure between premolars or molars normally presents two convex and one concave curvature as viewed from above.

Fig. 2.—Clasps applied medially and distally to a lower first molar.

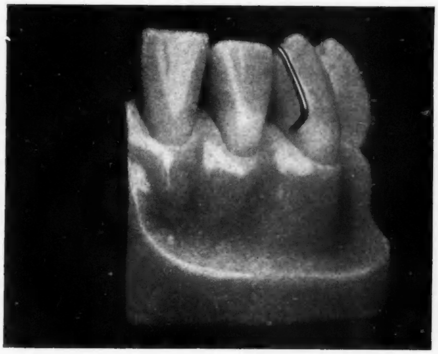

Fig. 3.—The clasp applied to the medial aspect of a lower left canine.

Fig. 4.—The clasp adapted for use with inter-maxillary elastics.

From the labial or buccal aspect the terminal arm is seen to incline from the vertical towards the point of application as in *Fig.* 2.

A noteworthy application of the clasp is to the medial or distal surface of a canine tooth

in order to retain an orthodontic appliance bearing anterior springs which might otherwise unseat the appliance (*Fig.* 3.) Such an appliance should of course also incorporate posterior clasps. If one of the latter clasps on each side does not also act as an occlusal rest, a short rest of 1·0 mm. wire may be made to engage a molar tooth between the lingual cusps.

Fig. 4 illustrates a modification of the clasp for the attachment of an intermaxillary elastic band. An alternative method is to construct the clasp of platinized gold wire and solder on an attachment for the elastic.

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THE PRESERVATION OF A HEALTHY MOUTH

By **A. E. PARROTT**, L.D.S. R.C.S. (Eng.)

"LET me see your teeth" said the Army doctor. "Blimey!" exclaimed the recruit. "I thought we was going to fight the Hun: I didn't know we had to eat him".

This was in a 1918 *Punch*, but nowadays so universally is lip-service paid to the doctrine of a healthy mouth in a healthy body that it might seem superfluous for me to spend time in establishing a case for your preserving a healthy mouth. However, I am convinced that you will adopt the admittedly rather exacting practices that I shall later commend to you, only if you are first really and sincerely convinced of the necessity of doing so; and secondly, if you understand something of the various processes by which our mouths can become unhealthy. Indeed, were your understanding of this latter sufficiently profound, you could work out from first principles for yourselves the fundamental mechanics of preserving healthy teeth and gums, but not without some irksome personal experiments which my advice may perhaps spare you! So I am going to devote much of this talk to Why, before passing on to How.

Crudely stated, the doctrine of "focal sepsis" postulates a "focus" of infection, such as an infected tooth or tonsil, somewhere in the body. From this focus, malevolent organisms and their poisonous products, or toxins, tour the body until lodgement is found in some favourable and possibly remote terrain, such as a joint, an internal organ, or an eye, and either wreak brisk havoc or else instigate an insidious process of undermining. Simple, plausible, and a perfect godsend to the healing profession. Nothing easier than a convincing demonstration of the presence of infection in the mouth: in most middle-aged mouths, pressure from a finger just below a tooth will bring the tell-tale bead of pus oozing from the junction of gum and tooth. The pus is there, in the mouth, and it is obviously being swallowed constantly. Hence, sir, your gastric ulcer; hence, madam, that distressing halitosis. Again, any layman can appreciate the implications of an X-ray photograph of a so-called "abscessed" tooth: the sinister dark area at the tip of the root, denoting a reservoir of pollution, from which poison seeps by day and night into the blood-stream and—who knows? —may be causing those creaking knee-joints. "Have them out" cried Sir John Hunter in 1910, stigmatizing the most cherished creations of dentistry as "veritable mausoleums of gold over a mass of sepsis". "Have them out" cried Sir Arthur Hurst at his Windsor Clinic in the early twenties; and to the ghostly echoes of these distinguished dicta have thousands upon thousands of human teeth been removed from their proper habitat and replaced by artificial ones.

The embarrassing persistence of a very large proportion of ailments which wholesale extractions had been intended to cure, has tempered

* Being the text of a lecture to a lay audience presented by the winner of the Gibbs Travelling Scholarship.

the enthusiasm of most modern dentists and physicians for these drastic measures; and modern research, commanding far greater accuracy of bacteriological and other techniques, and a sterner criticism of the means of selecting cases to "prove" theories, has suggested that the number of diseases which may in fact be caused by "focal sepsis" is much smaller than was believed even thirty years ago. But though the pendulum is making a timely swing in the opposite direction, do not think that there is now general cynicism in informed circles regarding the ill effects of unhealthy teeth. The dramatic improvement in, for instance, certain eye and digestive complaints which is manifest upon the removal of infected teeth, would forbid such an attitude. Before condemning teeth to the forceps, we now are less inclined to rely upon empirical theories, and we ask ourselves: is the ailment from which this patient suffers, really likely to be caused, or exacerbated, by dental infection; and, if so, what concrete evidence is there that there is active infection present and what means can be adopted to eliminate it without having resource to extractions? But above all these considerations, ranks that of showing our patients how a healthy mouth can be maintained, so that the question of disease may not arise. My personal attitude is impenitently æsthetic rather than physical, and I believe that it is this viewpoint that should commend itself to all civilized and reasonably fastidious people. The thought of having any sort of rottenness at the very entrance to one's body is surely nauseating. Decayed cavities, in which food, days or weeks old, lies putrefying: the place for compost is at the bottom of the garden, not in the mouth. Evil-smelling pus mixed with every mouthful chewed and swallowed, whether caviare or Yorkshire pudding: what a disgusting thought. To me, such outrages to the sensibility are the most telling of all considerations and of far more moment than whether my teeth may bring me to an early grave or premature Bath chair.

First, a brief sketch of the normal structure of a tooth and its adjacent tissues. The part visible in the mouth is the crown, and is covered with a layer of very hard, dense, enamel. It is by far the hardest substance in the whole body, contains virtually no organic matter at all, and is built up of long, crystalline prisms. This enamel is thickest at the biting surface, and chamfers off until it ends just below the gum margin. The bulk of the tooth is composed of dentine, not so hard as enamel and containing an appreciable amount of organic substance. It is built of a myriad of minute tubes, which are arranged to radiate from the central cavity which runs up the middle of the tooth for three-quarters of its length and contains the nerve or 'pulp' —a highly complex structure containing, not only nerve, but blood-vessels and lymphatics —almost an independent organism imprisoned in unyielding walls. The root of the tooth is covered with a very thin layer of a substance akin to bone, called cementum, and to the cementum are attached thousands of tiny fibres. The other ends of these fibres are attached to the bone surrounding the root, so you will see that the tooth is not simply embedded direct into the jaw-bone, but is slung in a sort of hammock. The fibres of this hammock form the "periodontal membrane": this membrane is continuous with the gum at the neck of the tooth, and its health and integrity are of the greatest possible importance to the health of the teeth themselves.

Now that we have some sort of mental picture of the construction of a tooth and its relation to its surroundings, we are better able to consider what things commonly go wrong with the teeth and how they may be prevented, or at least minimized.

Everybody has heard of the twin scourges of decay, or "dental caries", and pyorrhœa. Dentists have divided the condition known generally to the layman as pyorrhœa into a number of more or less closely related conditions, but the popular term is sufficient for our purposes.

Decay is basically the dissolving away of the tooth substance by acids produced by fermentation, and this fermentation is set up by bacteria. This bald account is of necessity the roughest of rough sketches: the whole picture is an enormous canvas, much of which is still hidden from our sight. Decay usually

starts between the teeth, at the necks of the teeth, or deep down in the fissures which are on the biting surfaces of the back teeth. In fact, just where particles of food and sticky films of food debris are most likely to lodge for any length of time. The bacteria that instigate the fermentation are active only under certain conditions, and these conditions demand the presence of that class of food known as "carbohydrates", which we know broadly as the sugary, starchy things. Other conditions must be fulfilled too, of course: you can have carbohydrates present and no decay: by luck or good management, certain individuals have some property, probably in their saliva, which will not permit the process of fermentation to proceed, and much work has recently been done on trying to discover the nature of such properties.

Pyorrhœa is even more difficult to describe in non-technical language. In the usual sort of case, the first step on the downward path is that the margins of the gums become inflamed, from stagnating food-particles around and between the teeth. Bacteria which flourish under these conditions produce toxins, which kill the superficial cells of the gum, eat away the uppermost fibres of the periodontal membrane, and even eat away the bone itself. A secondary result of this stagnation is the formation of hard deposits of tartar, something like the scale that forms inside a kettle, which adhere to the tooth around and below the gum margin. This calculus is a powerful mechanical irritant and scratches the tender tissues until they ulcerate and become even more inflamed. The more inflamed they become, the more they are damaged by mastication: they get torn away from the root of the tooth, since the fibres that should bind them to it have already been eroded by toxins, and the whole process continues in a very vicious spiral. Eventually, with the disappearance of periodontal membrane and bone, there is a clear space between the root of the tooth and the surrounding tissue. This space is the "pyorrhœa pocket", and it is in the depth of this pocket that pus forms. Unless the condition is arrested, the pocket gets deeper and deeper and the tooth looser and looser, until at last it becomes so uncomfortable that you are driven to extraction, or else local conditions become suddenly so favourable to the pus-forming bacteria that the whole process speeds up sensationally: infection spreads to the surrounding tissues and swelling with acute pain proclaims the formation of an abscess.

Now that you know how these diseases are caused, a little intelligent ratiocination should enable you to discover for yourselves all the things that you should do in order to prevent them! Let me guide your deliberations. One thing has stuck out a mile: that the common factor in decay and pyorrhœa is stagnating food. In decay the food has to be of a particular kind, carbohydrate, but as this is the food that tends to cling around teeth in any case, the generalization holds good. So we can do three things: we can eat food that does not cling around teeth, we can eat food that is not subject to bacterial action even if it does cling, and we can take steps to clean our mouths of all food debris so that it does not remain in contact with our teeth or gums for long enough to do damage. For practical purposes, the first two can be considered as one, so now for some words on diet. Its importance is obvious:

"Whatever Miss T. eats
Turns into Miss T".

But once the hard structure of the teeth has been laid down, and that is very early in life, nothing that we eat will affect the composition of the enamel or dentine, so we cannot hope to atone for poor quality teeth by eating calcium, in spite of a widespread delusion to the contrary. There are still some very primitive peoples who have hardly any dental troubles at all. We can take it for granted that the beneficial influence is their diet, from the fact that their teeth rapidly deteriorate the moment they take to civilized food. But these people range from certain Eskimos, with a carnivorous diet of seal and fish, to certain Polynesians with a wholly vegetarian diet, and the Australian aborigine whose diet consists mainly of raw bracken fronds and bark, and nearly raw kangaroo. We may deduce, then, that the common factor is not

the nutritive value of their diet but its physical nature. Tough, fibrous food, that has to be chewed and chewed. Go to any museum that has some really old human skulls, and look at the teeth. You will notice two things: no sign of decay, and biting surfaces that are worn so that the grooves and fissures are often completely obliterated and the tooth looks as though it has been polished by a lapidiarist. In these days, we have little food that can compare in physical quality to these primitive foodstuffs, and—let us face it—most of us would rather run the risk of false teeth by forty than deny ourselves the gastronomic delights and sophistications of our civilization. We can take both positive and negative action regarding our diet. There are certain foods, readily available and palatable, which have a detergent effect (in these days of soapless washing-up powders, that word is too familiar to need explanation), and if we were to finish every meal with such a food, we should derive very real benefit. Of these detergent foods, raw celery and raw apple are outstanding, both for their effect and their palatability, and there can be few better ways of finishing any meal, quite irrespective of the dental benefits bestowed. It must be thoroughly chewed, and the whole effect must not be ruined by such a practice as finishing off one's supper thus, and then having a sticky malt drink and a sweet biscuit a couple of hours later. Other suitable foods are raw carrots, lettuce, cucumber—in fact, most raw vegetables and hard raw fruits. Real wholemeal bread is as good, but very difficult to get, and hard rye-bread is admirable if one can get the real Swedish knackerbrod, but the emasculate versions popular in this country are of doubtful benefit. On the negative side, we should make a sustained effort to eschew sweet biscuits, particularly in conjunction with sweet or milky drinks, sticky confectionery of any kind, and above all, an excess of sweets. Probably because so many dentists themselves share the universal failing of a "sweet tooth", the evils of sweet-eating have been soft-pedalled, but there is no doubt that eating sweets in any number keeps the saliva in a state of perpetual sugariness, and therefore creates ideal conditions for the acid-producing bacteria. I hope that those of you who are parents will consider very seriously your responsibilities in this matter: once the habit of sweet-eating has taken hold, it is very difficult to say "no" to a child, but it would probably be far less harmful in the long run to let a child of six smoke!

Now to consider cleaning the teeth. The only really effective way to teach this is by individual and personal demonstration: in a lecture, without films, slides, or even a blackboard, it is quite impossible. But we can get a good idea of what we should try to do, and for practical demonstration the next visit to the dentist must afford the opportunity. We aim to remove all food debris and carbohydrate film from all surfaces of all teeth, and we aim to massage and stimulate the gums, trying with the brush to imitate the effect of the constant friction that the chewing of tough foods has on the gums of the fortunate savage, rubbing away the old dead cells from the surface and generally keeping them "toned up" by proper and vigorous use. The brush itself: many shapes and sizes are available; they are rather like golf putters, where the top-class professionals use plain ones and leave the freaks to the rabbits. One with a straight handle, a short, straight, level head, with the bristles arranged in tufts three deep, will do everything that one can ask of a brush. Similarly with the paste or powder: use one that is detergent and pleasant to taste, and avoid any which make extravagant claims, or contain gritty or very highly-flavoured ingredients. If you come across one which contains a substance known as sodium perborate, avoid it like the plague. Brush thoughtfully. Abandon for ever the hearty horizontal scrubbing, and imagine that you are cleaning a comb with a brush, for this is a good parallel. You would not dream of brushing across the teeth of the comb: you would start at the base of the comb and brush upwards, seeing that the bristles went between the teeth and dislodged all the dirt. Apply this to your own teeth: and above all, brush them systematically, following the same routine every time and making sure that every

surface of every tooth is brushed. Start with the cheek surface of the last tooth on the bottom left-hand side. Place the bristles firmly against the gum, just below the tooth and pointing slightly upward. With rapid circular movements, of very small diameter, vibrate the brush against the gum and tooth, taking care to feel the bristles go between the tooth and the one in front, and so that the path of the brush is from the gum towards the crown. The handle of the brush should be parallel with the ground, and the whole width of the brush employed. Do this four or five times, without letting the bristles lose contact at all. Then remove the brush, put it back again in precisely the same place, and do the whole action over again. Repeat this cycle three times, and then move forward to the next tooth. When you reach the front teeth, you will find yourself compelled to hold the handle of the brush more vertically, and use the toe of the brush instead of the whole width, but bear in mind that you are trying to do the same thing all the time. When you have worked right round the cheek surface of all teeth, upper and lower, do the same again on the inner or tongue surfaces. When you have done this, and to begin with it is tedious and difficult, brush the biting surfaces of the back teeth with a sharp, vigorous, stabbing action, with bristles vertical to the surface—this will loosen food from the fissures, which you will finally clear by vigorous rinsing. That, very briefly, is how to brush your teeth: let me repeat the importance of the systematic routine, every surface of every tooth every time. It takes time and it takes thought—probably less of either than most ladies spend on their hair, and little longer than most men over their shaving. But consider seriously the benefits, and agree that it is well worth getting up just that much earlier (you will note my assumption that the last thing you ate before retiring was an apple!)

There are certain other things that may help to preserve a healthy mouth, but many of them are still in the realms of speculation. Fluorine in the drinking-water, dentifrices containing urea, vegetables grown wholly without artificial fertilizers on compost-dressed soil: there is at least prima facie evidence for believing that any of these may make for sound teeth, but not enough for me, having no axes of my own to grind, to advise you to try. As the cynic said of praying for rain, "it can't do harm and might even do good". The problem we are really up against is to strike a compromise between health and civilization, and the problem is almost insoluble. It is a matter in which guidance is more important than instruction, since only individual decisions, freely made, can be effective, and this is why I would once again emphasize the importance of your understanding what goes on in your mouth. Trying to maintain a healthy dentition without this understanding is putting yourselves in the position of the wheel-tapper in the song, who tapped without knowing why.

Finally, I would draw your attention to the implications of the title of this lecture: it is the "preservation", and not the creation, of a healthy mouth. It implies that your mouth is healthy to begin with, and, if it is not, you should take prompt steps to remedy this. Since I do not wish to give the appearance of promoting professional sales talk, I must hope that the hint will be taken without my having to give more specific instruction!

LOCAL ANALGESICS AND CORONARY ARTERY DISEASE

In answer to a question as to whether local analgesics for dental operations were contra-indicated in those with coronary artery disease, and whether or not there were any special precautions advised in such cases, the following reply was given.

There is no reason why the average patient with coronary artery disease should not have a local analgesic of this sort. Where there is a history of a recent heart attack it is perhaps better to avoid the adrenaline. In any case the concentration of adrenaline in the solution should not exceed 1 in 200,000. Solutions commonly supplied for dental use often have a higher concentration of adrenaline than this.—Any Questions (1954), *Brit. med. J.*, 1, 107.

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THE FREE-END SADDLE AND THE PERIODONTAL PATIENT*

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BEFORE discussing the principles of design for free-end saddle partial dentures it is necessary to consider what happens to such a denture during mastication. For this purpose may be considered the vertical, lateral, and antero-posterior components of force that may be applied to it.

Fig. 1.—Lower bilateral free-end saddle denture with cast clasps and occlusal rests.

The Vertical Component.—The vertical force acts as food is being crushed between the upper and lower occlusal surfaces before they make contact. It also acts as a component with horizontal forces in the final stage of mastication when the lower teeth move in contact from an ex-centric to the centric position, and during tooth occlusion when mastication is not taking place.

Since a free-end saddle is only tooth-supported anteriorly, the edentulous alveolus must bear part of the vertical stress. As an example may be considered the lower denture having bilateral free-end saddles with cast three-arm clasps with occlusal rests on the first premolars (*Fig.* 1) and made on a model cast from a mucostatic impression. The compressibility of the tissues under these saddles is greater than that of the abutment teeth and it increases posteriorly towards the region of the retromolar pad. On the application of vertical force, the abutment teeth tend to be displaced very slightly but the alveolar soft tissues to a greater degree (*Fig.* 2). This results in a rotation of the denture, the saddles being displaced into the soft tissues posteriorly; the occlusal rests on the abutments being considered the centres of this rotatory movement.

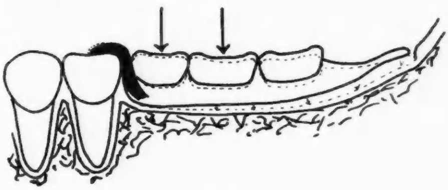

Fig. 2.—Compressibility of mucosa under vertical load.

In actual fact the amount of movement that takes place at the free end of these

* A paper read before the British Society of Periodontology on Wednesday, Dec. 16, 1953. Many of the views expressed in this paper are taken from *Partial Dentures*, by J. Osborne and G. A. Lammie, published by Blackwell Scientific Publications Ltd.

saddles is very small indeed. It depends on the nature and amount of fibrous submucosa that covers the alveolar ridge, and this can always be assessed by palpation.

Having described the rotatory movement resulting from the compressibility of the alveolar soft tissues, we should consider the possibility of the vertical force causing bone resorption. When the vertical pressure exceeds the physiological limit of the individual bone, resorption will ensue. Although from this point of view the lateral component of force is probably the more destructive, the vertical

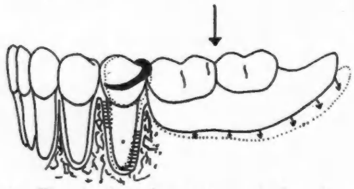

Fig. 3.—The backward rotation of the clasped abutment as the saddle sinks under vertical load.

force is nevertheless significant. In the example mentioned above, this force would be distributed between the abutment teeth and the bone under the saddles. In order to reduce the pressure falling on any unit area of the alveolar bone, it is wise to make the saddle cover as large an area as possible. However, even granting maximal saddle coverage, the pressure developed over the bone supporting the free-end saddles is very liable to exceed the tolerance limit. Resorption of the alveolus under free-end saddles is one of the biggest problems in partial denture prosthesis.

Once some resorption has occurred, and if no attempt has been made to restore the fit of the saddle by rebasing, further resorption is all the more likely to occur since the amount of downward displacement under vertical load is increased.

So far no consideration has been given to the fact that the denture has two cast three-arm clasps on the abutment premolars. If the clasp arms rigidly embrace the abutment tooth they will tend, on vertical loading of the saddle, to rotate the tooth distally, the centre of the movement being located in the root of the tooth between its apex and the gingival margin (*Fig.* 3). Tensile forces will, therefore, act on the bony socket of the tooth, mesially towards the gingival margin and distally towards the apex. If displacement of the free-end saddle is small, the whole resistance to the torque is met by the fibres and bone in the areas described. However, where the displacement of the saddle is greater, and this would be the case when bony resorption had already taken place, compressive forces would act distally towards the gingival margin and mesially towards the apex. If such forces act with sufficient intensity they can effect a breakdown of the periodontal and bony support of the abutment teeth; this appears clinically as a loose tooth showing thickening of the periodontal membrane as well as bone resorption. It must be remembered that to place such a torque on a tooth is to subject it to a horizontal stress that is not applied naturally. Hence the possibility of rapid breakdown of the tooth-supporting structures. However, a three-arm clasp never grips an abutment rigidly. Under a vertical load applied to the saddle there is some slight movement of the clasp arms over the enamel surface. Its degree depends on the thickness of the flexible portion of the clasp arms, the modulus of elasticity of the alloy used, and the degree of undercut on the tooth. The thinner the clasp arms and the lower the modulus of elasticity, the greater will be the amount of movement permitted. Also the movement will be greater when a wrought wire clasp is substituted for one that is cast.

Additional stress to the tooth may arise directly from the vertical pressure but is not likely to prove harmful since it will be resisted in the long axis of the tooth.

The effects of clasping are that the more rigid the clasp the greater the torque on the tooth and the less the load on the alveolar ridge; the more flexible the clasp arms the less torque on the tooth and more load on the ridge.

The Lateral Component.—Lower free-end saddles tend to be displaced laterally as a result of the inclined plane action of the cusps of the posterior teeth, and the steeper the

cusp inclines the greater will be the force that acts laterally. Lateral force acts during that stage of the masticatory cycle when the opposing teeth, having come into contact in an ex-centric position, return to centric occlusion. Some lateral force also acts on a saddle during those tooth contacts which may take place at times other than during mastication.

A lateral displacement of one of the free-end saddles is resisted by the following structures (*Fig.* 4), always assuming a rigid connexion between the saddles:—

Stress Communicated by	*Resisting Structure*
Working side saddle	Buccal alveolar plate on working side
Buccal arm of clasp on working side	Abutment tooth on working side
Balancing side saddle	Lingual alveolar plate on balancing side
Lingual arm of clasp on balancing side	Abutment tooth on balancing side
Continuous clasp (if included in design)	Standing teeth on balancing side
Lingual plate (if included in design)	Lingual plate of alveolus supporting standing teeth on balancing side

It must not be assumed that the denture moves bodily in a lateral direction, since there is less resistance to lateral stress at the posterior end of the working side saddle. Anteriorly the buccal clasp arm prevents movement, but posteriorly the buccal alveolus alone resists the lateral displacement. In this it is less effective than the tooth; its efficiency depends upon the prominence of the ridge and the compressibility of the soft tissues that overlie it. A flat ridge with a marked fibrosis of the submucosa offers comparatively little resistance, but if the ridge is well formed and shows a thinner submucosa, resistance is increased.

The absence of a posterior abutment tooth, therefore, possibly results in another rotational effect with the clasped abutment tooth as its centre. Fortunately, if there is rigid connexion between the two saddles, this rotational torque on the working side is resisted on the balancing side by an anterior pressure of the saddle against the distal surface of its abutment.

The lateral displacement described may have a deleterious effect on the alveolar ridge, and it is certain that the lateral component of force is a bigger factor in ridge resorption than the vertical. Provided a rigid bar connects the working and balancing side saddles, the structures listed on the balancing side aid in resisting the lateral stress and reduce deleterious effects by distributing the load over a larger area of bone. Unfortunately appliances are too often constructed where a certain

Fig. 4.—The heavily lined structures communicate lateral stress to the tissues lying beneath them.

flexibility exists in the system connecting the two saddles. Such flexibility throws an unnecessarily large share of the load on the working side tissues.

If the abutment tooth is held securely by a deep occlusal rest or clasp arms which encompass the tooth on three sides, a rotation tends to be effected about its long axis. The degree to which this takes place once again depends on the type of clasping. The more rigid the clasp the greater will be the forces acting. Wrought wire or Roach clasping conveys less lateral or rotational force to the abutment tooth than does a cast three-arm clasp, but throws more lateral load on the edentulous alveolus.

The Anteroposterior Component.—In protrusive movement the occlusal surfaces of the upper and lower dentitions come together in a protrusive position. As a result of inclined plane action this produces a backward force on the lower denture, the magnitude of which will depend on the musculature and the steepness of the cusp angles. Although in mastication the purely protrusive movement is not often used, there is generally a degree of protrusive movement complicating

the lateral excursion of the mandible in each masticatory cycle. However, there is often a marked protrusive element in those tooth occlusions that may occur when food is not being chewed.

This backward force is in part resisted by the alveolus in the region of the retromolar pad, but the greater part of the resistance comes from the clasped abutment tooth. The arms of the three-arm clasp encompass the tooth almost completely on its buccal and lingual surfaces, and certainly the tips of the arms lie on the mesial half of the crown. In this way these arms exert a backward tension on the crown of the abutment. A backward leverage is, therefore, placed upon the root, whose supporting alveolar bone is called upon, in the main, to resist posterior displacement of the denture. Once again the resistance offered to this backward displacement will depend on the type of clasping. The arms of the cast three-arm clasp will displace laterally less under the stress than would those of a wrought wire; in this latter case less tension would be placed on the tooth but the greater would be the possibility of an unstable denture and a traumatic pressure on the alveolus posteriorly.

The vertical, lateral, and anteroposterior components of force have been described separately and their effects discussed as different entities. In actual practice these represent component forces in three planes at right angles, so that any force can be resolved in terms of the three. It is probable that at any one time all these forces will be operative and the stress acting on the abutment teeth or alveolar bone will have the end-result of combining the effects described.

TREATMENT OF THE FREE-END SADDLE

The following suggestions regarding the design of free-end saddle dentures are based on an appreciation of two factors which are evident from the preceding discussion: first, that abutment teeth are subjected to torques in both anteroposterior and lateral directions, which are liable to cause breakdown of their supporting structures; second, that the edentulous alveolus must always bear some part of the masticatory load and hence alveolar resorption is likely to occur. The following approaches to the problem are aimed at giving the optimum reaction in both teeth and alveolus.

1. *Reduction of the Load.*
2. *Distribution of the Load between Teeth and Alveolus.—*

a. By varying the nature of the connexion between clasp and saddle: (i) stress breaking; (ii) combining rigid connexion and gingivally approaching clasping; (iii) combining rigid connexion and occlusally approaching clasping.

b. By anterior placement of the occlusal rest.

c. By mucocompression.

3. *Wide Distribution of the Load.—*

a. Over more than one abutment tooth on each side.

b. Over the maximal area of edentulous alveolus.

REDUCTION OF THE LOAD

The vertical load may be reduced by decreasing the area of the occlusal table. This may be accomplished by using narrow teeth, by leaving a tooth off the saddle, or by using canines and premolars instead of premolars and molars. This modification to a denture is most necessary when the bite is heavy, the saddle long, or the bone factor poor. Such a reduction in load also reduces the lateral component of force, thus helping to preserve the ridge form and the supporting tissues of the abutment teeth.

DISTRIBUTION OF LOAD BETWEEN TEETH AND ALVEOLUS

1. *By Varying the Nature of the Connexion between Clasp and Saddle.—*

a. Stress Breaking.—Any device which allows movement between the saddle and the retaining unit is known as a stress breaker. If, instead of a rigid connexion between clasp and saddle, some degree of movement between the two is possible, the stresses on the denture are differently distributed. If, for the case illustrated in *Fig.* 1, a denture were constructed as shown in *Fig.* 5, on application of a vertical load the saddles would be displaced downwards into the soft tissues

covering the edentulous alveolus to a greater extent than if the retainer and occlusal rest had direct connexion with the saddle. This means that the alveolar bone is called upon to withstand more vertical load than formerly, which is more evenly spread over the whole alveolus rather than concentrated at its free end. Some of the load is used in stressing the wrought wire elastically, but the proportion of force used in this way is usually small. Although not quite accurate it may be assumed that the centre of saddle rotation is the junction of the wire stress breaker and the lingual bar. This point lies anterior and inferior to the clasped abutment tooth, and, therefore, now causes a downward and slightly forward movement. The premolar is well fitted to accept the vertical force and more fitted to resist a forward than a backward torque because of the buttressing effect of teeth lying anterior to it.

The net result of the stress-breaking action as far as the vertical component is concerned is a greater assignment of load to the edentulous alveolus and less to the abutment tooth.

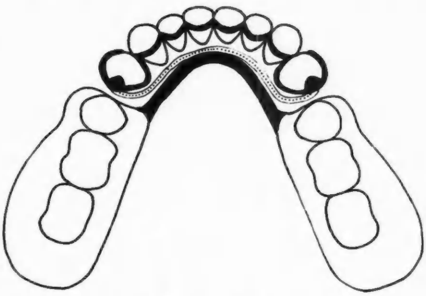

Fig. 5.—Lower bilateral free-end saddle denture designed with a stress breaker connecting the saddles and retainer unit.

The torque on the abutment is markedly reduced in magnitude and changed favourably in direction.

When a lateral component acts on the stress-broken saddle a greatly increased lateral stress is placed on the alveolar bone. Less of the load falls on the abutment teeth and consequently the magnitude of the damaging lateral torque is reduced. If a continuous clasp is included in the design it is incorporated in the retainer unit and thus plays little part in the distribution of lateral load.

The effectiveness of the stress-breaking action on the anterior component of force depends on the arch form. Where this is square the anterior portion of the wrought

Fig. 6.—Wrought gold wire forming the flexible connector type of stress breaker.

wire is more readily displaced and tends to allow a backward movement of the saddle in relation to the abutment tooth. This places a greater proportion of pressure on the alveolus in the retromolar region, whilst the torque on the abutment tooth due to this backward force is correspondingly reduced. When, however, the length of a stress breaker which lies in the coronal plane is small, as in a markedly tapering arch, the wire is tensed rather than flexed and less backward movement of the saddle is allowed. In this case the twisting force on the tooth is not so greatly reduced.

It can, therefore, be concluded that the dangerous horizontal torques acting on the abutment teeth are reduced by stress breaking and that, in consequence, their supporting structures are less liable to break down. However, the edentulous alveolus is called upon to accept more vertical and horizontal stress and as a result tends to resorb more quickly.

Stress breakers may be divided into two groups. First, those having a movable joint between the retainer and the saddle, and, second, those having a flexible connexion between the retainer and the saddle. The

author's experience is limited to those of the second group, in which the connector may be a wrought gold wire (*Fig.* 6) or a thicker section bar of cast metal incorporated in the denture base.

The advantages of the wrought wire connector over the cast connector are:—

i. A more flexible union is obtained between the retainer unit and the saddle.

ii. The round section of the wire connector allows equal freedom of movement in all directions radial to its section, whereas the often flatter cast connector allows movement best where the stress acts across the thinnest section.

iii. The metallurgical condition of the wrought wire makes it less liable to fracture as a result of the intermittent stressing than the cast connector, which tends to crystallize and fatigue.

The wrought wire connector, however, has the following disadvantages when compared with its cast counterpart:—

i. The wrought gold wire connector is always soldered to the saddle or retainers. These soldered joints may possibly fracture as a result of fatigue.

ii. Since soldering to chrome-cobalt alloys is difficult, wrought connectors are normally limited to gold dentures.

iii. The gold wires are more liable to be deformed accidentally than the thicker cast connectors.

iv. The accurate relationship between the saddles and the retainer unit is liable to be lost when soldering.

One of the most important advantages of the wrought wire stress breaker is the first one listed, that is a more flexible union between the retainer and the saddle. It is particularly desirable to apply this when the teeth show considerable periodontal involvement, since by this means the torques on the abutment teeth are reduced as much as possible. However, in other cases a less flexible union may be desirable in order to throw relatively more stress on the standing teeth and less on the alveolus, and in such cases a cast connector is preferable. Hence it can be seen that the stress-breaking action may be graded so that greater or less force is transferred to the standing teeth. The flexibility of the stress breaker governs this distribution of load and depends on:—

i. Whether a wrought or cast connector is used.

ii. The length and position of the connector, and

iii. The cross-sectional dimension and shape of the connector.

The advantages of the stress-breaking principle may be listed as follows:—

i. Horizontal forces acting on abutment teeth are minimized. As a consequence the bony support of these teeth is preserved.

ii. By careful choice of the type of flexible connector it is possible to obtain a balance of stress between alveolus and abutment.

iii. If rebasing is not undertaken when necessary the abutment tooth is not necessarily damaged.

iv. Splinting of standing teeth is facilitated.

v. Since the retentive unit remains passive there is a feeling of security when a stress-broken denture is worn.

The disadvantages of stress breakers are:—

i. Mechanically the appliance is difficult to construct and thus the denture must be more expensive.

ii. There is a concentration of vertical and horizontal force on the edentulous alveolus, resulting in its speedier resorption.

iii. The effectiveness of indirect retention is reduced.

iv. The more complicated appliance is sometimes not well tolerated by the patient. Spaces between components are sometimes opened up in function, thus trapping food and the tongue.

v. If a light flexible connector is used it can easily be bent and distorted in cleaning or as a result of accident. Such a malplaced connector induces a continuous stress on the abutments, rapidly loosening them.

vi. Repair of either a hinge type stress breaker or a flexible connector is difficult.

vii. If rebasing is not undertaken when necessary marked alveolar resorption ensues.

b. Combining Rigid Connexion and Gingivally Approaching Clasping.—When a rigid

connexion between retainers and saddles is used, but when gingivally approaching clasps (*Fig.* 7) are preferred to occlusally approaching clasps, a condition exists which is similar in principle to stress breaking. The most commonly used clasps of this type employed with lower free-end saddle dentures are the Roach and reverse back action. The part of these clasps which makes contact with the tooth is connected to the saddle by means of a metal bar, which has a variable amount of resilience depending upon its alloy of manufacture, its length, and its section. Now, if the occlusal rest is allowed to move over the occlusal surface of the tooth to a small degree in lateral and anteroposterior directions (and this is allowed when saucer-shaped rest seat preparations are used), the action of the clasp bar resembles a stress breaker, reducing the horizontal forces on the abutment tooth but placing greater loads on the alveolus. The effectiveness of the stress-breaking action of these clasps may be increased by increasing the length of the bar. This may be achieved by taking it more deeply into the sulcus and by attaching it to the saddle at a point further removed from the tooth.

c. Combining Rigid Connexion and Occlusally Approaching Clasping.—A combination of rigid connexion and occlusally approaching clasps is the opposite extreme from stress breaking. In this condition the maximum load is placed on the abutment tooth and the minimum on the alveolus: the former is, therefore, more predisposed to pathological involvement than the latter. Even within this group the proportion of load falling on tooth and alveolus is capable of variation and depends on the type of clasping used. When the arm is resilient, a certain amount of movement of the clasp over the surface of the tooth is permitted. At one extreme a wrought gold wire clasp allows most movement of the clasp over the enamel, whereas a cast chrome-cobalt clasp permits least. Thus under vertical and horizontal loading least stress is placed on the tooth when a wrought gold wire clasp is used, whilst the alveolus is more heavily stressed. The opposite condition pertains with cast chrome-cobalt clasps.

It should be emphasized that the extent of these clasp movements is small (otherwise an unstable denture would result), but they may, however, be sufficient to reduce the torques acting on the abutment and keep them within the physiological limit. Once again the indication is for saucer-shaped rest seat preparations; box-shaped preparations have no place in free-end saddle cases unless a stress breaker is used.

Fig. 7.—An example of a gingivally approaching clasp.

The advantages of the methods where rigid connexion between clasp and saddle is used are:—

i. Mechanically these appliances are relatively easy to make.

ii. A desirable distribution of stress between abutment and alveolus may be obtained by wise choice of the clasping method.

iii. A continuous clasp when incorporated in the design, acts as an efficient indirect retainer and distributes the lateral load to the standing teeth of the balancing side.

iv. The number of very flexible parts is reduced and consequently there is less danger of displacing these accidentally or during cleaning.

v. Rebasing is not so frequently required as when a stress breaker is used since the alveolus is not loaded so heavily.

The disadvantages of the method are:—

i. Torques that may prove pathological are placed on the abutment teeth.

ii. Immobilization of the teeth cannot be as effective as when stress breaking is used.

iii. There is a danger of crystallization and fracture of clasps.

iv. When a large range of clasp movement over the tooth is permitted the patient experiences a sense of insecurity.

v. If rebasing is not carried out when necessary there is a grave danger of damaging the supporting structure of the abutment tooth.

2. *By Anterior Placement of the Occlusal Rest.*—The distribution of forces between abutment and alveolus can be altered, sometimes favourably, by anterior placement of the

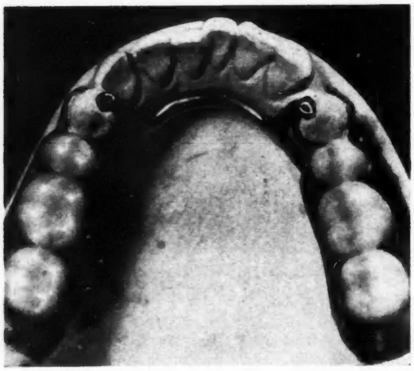

Fig. 8.—Anterior placement of occlusal rests.

occlusal rest. In *Fig.* 8 the rest is shown on the mesial aspect of the occlusal surface of the tooth. The clasping consists of a rigid cast arm lingually, which lies on the survey line, and a retentive Roach arm buccally. When the saddle is loaded vertically it is depressed into the soft tissues of the alveolus, a rotation taking place about the occlusal rests. Since these are more anteriorly placed a greater part of the load is now borne by the alveolus and proportionately less by the tooth. Further, since the saddle is further removed from the fulcrum point, the stress over the alveolus is more evenly distributed in an anteroposterior direction and the bone nearer to the abutment receives a greater share of the load.

The nature of the forces acting on the abutment have also changed. The combined action of the occlusal rest and clasping is not to rotate the tooth backward but rather in a forward direction. This tendency is generally resisted by contact with contiguous teeth and consequently the direction of the torque has been changed favourably. When this clasping is used the twisting force is minimal and is largely due to the position of the occlusal rest in relation to the long axis of the tooth.

Sometimes the occlusal rest may be more anteriorly placed than in the case illustrated. For instance, a saddle replacing only molar teeth may have the rest on the mesial aspect of the first premolar. However, the farther removed the rest, the greater is the proportion of vertical load which falls on the saddle.

The horizontal components of force acting on the saddle have similar effects on abutment and alveolus to those described when the rest is situated on the distal surface of the tooth, abutting on the saddle.

3. *By Mucocompression.*—The third and last method of distributing the load suitably between abutment teeth and the edentulous alveoli is by compressing the mucosa covering the alveolus.

It is necessary at this stage to differentiate between mucostasis and mucocompression. A model cast from a mucostatic impression represents the tissues as they are at rest with little or no displacement of the mucosa. Examples of such mucostatic impression materials are the alginates.

On the other hand, a model cast from a mucocompressive impression represents the tissues as they are under load, composition being the impression material used for the working impression or in a physiological rebasing method. A technique using composition can only approximate to a truly compressive state, which distributes load equally to all tissues. The more viscous the material used for taking the impression the more nearly will such a state be approached. It is, however, not suggested that such a state is ideal. It can, therefore, be envisaged that the terms mucostatic and mucocompressive are only relative and do not refer to two fixed states. Rather is it more accurate to regard impression techniques as effecting varying degrees of tissue compression, the so-called mucostatic techniques showing minimal compression, and the mucocompressive methods causing varying degrees of soft-tissue displacement.

The zinc oxide and eugenol pastes may be used to give a certain degree of compression, although the maximum obtainable with composition cannot be obtained. Once again the amount of compression depends on the viscosity of the particular paste used and the thickness of the material. Since impression pastes are used in thin layers a considerable amount of soft-tissue compression can be obtained.

Having established that different impression materials handled in different ways give varying degrees of soft-tissue compression it is in order to consider the effects of compression on the free-end saddle in particular. The more compression that is effected in the impression or rebasing technique, and the nearer the compressibility of the soft tissues covering the alveolus approaches that of the abutment tooth, the less will be the tilting effect on the clasped abutment as a result of sinking of the posterior saddle. The saddle base fitting accurately against the mucosa from which tissue fluid has already been displaced, sinks less under the masticatory load than if it fitted against an uncompressed mucosa. Therefore, the greater the amount of compression the less is the magnitude of the damaging backward torque on the abutment, when a vertical load is placed on the saddle.

It will be evident, too, that the amount of compression affects the distribution of load between abutment and alveolar bone. The greater the compression the more evenly is the stress distributed between the abutment and the edentulous alveolar bone.

Hence, reduction of torque action and uniform loading of the edentulous alveolus are desirable features to be gained by heavy compression. However, it will be appreciated that the tissues cannot be continuously subjected to such heavy pressure.

The natural tendency of the compressed tissue is to recoil elastically. In assuming that the saddle is maintained in the closest approximation with the compressed mucosa, the presence of some force to hold it in this position is also assumed. This force can only be derived from a rigid clasping of the abutment tooth and results in a continuous force acting on the abutment. The direction of this resultant torque is admittedly more favourable than that which acts when the saddle is vertically loaded since it is resisted by the abutment contacting a more anterior tooth. The fact that its magnitude is small is offset by its continuous nature.

It is thus seen that the use of rigid connexion and clasping, together with heavy compression, leads to an intolerable situation in respect of damage to the abutment and covering mucosa. If heavy compression is to be used, arrangement must be made to allow some recoil of the compressed tissues. This can be achieved either by very light clasping, generally wrought gold wires of thin gauge, or by a stress breaker where the connector between the saddles and retainer unit is of the most flexible type. Such a stress breaker is always a wrought gold wire of suitable section and never a cast connector.

At the other extreme, with mucostasis, even when cast clasps are directly attached to the saddles, no forces act either on the alveolus or abutment when the saddle is not under load. In the resting state, too, adhesion is maximal. Mucostatic impression techniques are generally simple, and provided manufacturer's instructions are carried out meticulously, good results are obtainable by those whose experience is limited.

With such a technique and where rigid clasping directly attached to the saddle is used, maximal torque is placed on the abutment teeth, which are, therefore, predisposed to periodontal breakdown. The amount of downward movement of the saddle posteriorly can be marked where the tissues are compressible and results in the patient having a sense of insecurity when using the denture. With this type of impression, too, the bone is not evenly stressed, the areas underlying thinner and firmer mucosa receiving an increased share of the load.

There is, however, a light compressive state intermediate between heavy compression and mucostasis that has considerable advantage and is frequently used by the writer. If a small amount of compression is effected under a free-end saddle, the amount of tissue-wards

movement which can be produced when vertical pressure is applied is considerably reduced. This has the effect of reducing the torque on the abutment tooth if the clasp is directly attached to the saddle or if a more

rigid type of stress breaker is preferred. Thus a compromise between stasis and heavy compression seems to give a result with the advantages of each present to some degree.

WIDE DISTRIBUTION OF LOAD

1. *Wide Distribution of Load over the Teeth.*—The vertical load cannot readily be distributed over more than one tooth on each side of the arch because of the rotation that takes place about an axis through the two most posteriorly placed occlusal rests. Some degree of distribution does, however, take place in the two methods illustrated.

The first possibility (*Fig.* 9) is to move the occlusal rest anteriorly so that it lies not on the tooth, which immediately bounds the saddle, but on the occlusal surface of the tooth which lies immediately anterior. If a rest is placed on this tooth some of the vertical load is placed upon it and its marginal ridge becomes the fulcrum point. If now two flexible arms arise from this and encompass the buccal and lingual surfaces of the posterior tooth, and if these arms lie above the survey lines then some of the vertical load is dispersed. Part is dissipated in opening the clasp arms and part is directed down the long axis of the tooth. A slight torque is placed upon this tooth due to the posterior saddle sinkage. It should be noted, however, that the torque tends to rotate the tooth in a forward rather than a backward direction. The retaining clasp is now on the rested tooth, which accepts vertical load through the occlusal rest. Lateral load is distributed to the two teeth by the clasp arms as a result of frequent stressing.

In the second method the occlusal rest is placed in its conventional position on the

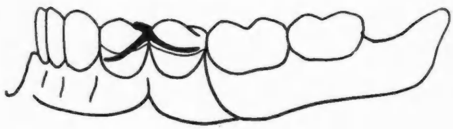

Fig. 9.—Multiple clasping. Note relation of clasp arms to survey lines on the two clasped teeth.

tooth bounding the saddle. Multiple Roach clasps are directly connected to the saddle (*Fig.* 10), and convey a small share of the vertical and lateral load to the teeth they contact.

2. *Wide Distribution of Load over the Alveolus.*—The saddles of the denture should

Fig. 10.—Multiple Roach clasping.

always cover the largest possible area so that the pressure falling on any unit area of the edentulous ridge is reduced under vertical and horizontal loading. The saddle should, therefore, cover the retromolar area and extend fully over the buccal plate.

SUMMARY

The forces that may be applied to a free-end saddle lower denture have been considered. For the purpose of discussion they have been divided into vertical, lateral, and antero-posterior forces, but in function it is not possible to separate them. They may be applied during mastication and at other periods of rest or concentration.

An attempt has been made to outline the general principles of a treatment plan for the free-end saddle denture, emphasizing the alternatives in cases showing periodontal involvement.

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CYSTIC TUBERCULOSIS OF BONE

The following interesting case has been reported:—

A female office worker, aged 18, was admitted to Morland Clinics on June 24, 1949, complaining of multiple soft-tissue swellings which had developed during the previous nine months. One year previously she had had pulmonary tuberculosis in which activity had subsided after three months. Discharging sinuses were present over one elbow, fingers, heel, knee, and the left mandible. The sinus over the mandible discharged unpleasantly into her mouth. The blood-count was normal. Erythrocyte sedimentation rate in 1 hour was 56 mm.

The patient was treated by:—

1. Recumbency, with immobilization of the wrists and the affected finger and of the lower limbs.

2. Para-aminosalicylic acid therapy (20 g. daily, 6 days a week for 16 months).

3. Aspiration of the abscess in the right calf.

Pus from abscesses gave positive animal inoculation tests for tubercle bacilli. The histological findings from a biopsy of the gum over the left mandible were suggestive of tuberculosis infection. The radiological lesion is illustrated in its active and healed phases. All the lesions healed satisfactorily and the patient became ambulant on Feb. 1, 1954, and was discharged on April 27. On Oct. 21, 1953, she was entirely well, with no residual disability.—Murray, R. O. (1954), *Proc. R. Soc. Med.*, **47**, No. 2, 133.

THE PALATAL PLATE IN PEDODONTIC PRACTICE

The removable palatal plate is a very useful and versatile appliance for the prevention and interception of many incipient malocclusions. Basically it consists of: (1) A palatal portion for anchorage; (2) Clazor for retention; (3) Attachments, the number of uses of which are limited only by the ingenuity of the operator.

Amongst its uses are: (1) Space maintenance; (2) Arch expansion; (3) Bite opener; (4) Individual or group movement of teeth; (5) Habit breaker (e.g., thumb or tongue).—Massler, M., and Barber, T. K. (1953), *J. Dent. Child.*, **20**, 85.

PARLIAMENTARY NEWS

Employment of Dental Technicians

On the motion for the adjournment, Mr. R. E. Winterbottom (Lab., Brightside) called attention to the employment of dental technicians in the National Health Service. "Large numbers of dental technicians, highly skilled, are now unemployed", he said. The figures were such as to cause distinct alarm because they showed that dental health was now at a discount. The effect of the cuts in the dental service had not only created unemployment among dental technicians but also loss of work to dentists and to those other ancillaries in the dental profession.

Mr. Winterbottom said it took at least five years to give a dental practitioner the rudiments of knowledge of his job. "I do not think it is wise or right or good for this country that we should have men who have to study so hard on a highly scientific and technical job, faced with the dangers of unemployment and the consequences in the loss to the Dental Health Service of this country".

He thought it would be folly on the part of parents to apprentice a boy to the craft of a dental technician, when he was 16 years of age, because he was only going into a blind alley job. In most cases, after five years apprenticeship, they were taken into the Army. When they came back and re-started to learn their craftsmanship, they usually found they got the six months' service which the Army guaranteed and were then "pushed out into the streets".

If the Dental Health Service of Britain was developed as it should be, they would find themselves faced with a serious shortage not only of dentists and dental surgeons but of dental technicians too.

Mrs. F. K. Corbett (Lab., Peckham) asked that the matter be looked at "from the national rather than a sectional aspect by the Ministry".

Miss Pat Hornsby-Smith (Parliamentary Secretary to the Ministry of Health) said that five million dentures were provided under the Health Scheme in 1950 and the demand had fallen to what might be a fairly consistent level of two million by 1953. There were more dental technicians now trained than could be readily employed on this specialized work. She emphasized that they were not directly contracted and controlled by the Ministry.

"We do not believe wiping away the charges would necessarily inflate the demand to a great number. Nor do we believe it would be right policy to reverse the present emphasis on conservative treatment and, at some expense to the Exchequer, put the accent on dentures".

The debate was concluded. (*Th., April* 15, 1954.)

ITALIAN DENTISTRY CONGRESS

Venice, Sept. 13–18, 1954

The Twenty-ninth Italian Dentistry Congress sponsored by the Italian Dentist Association and the Italian Stomatology Society will take place in Venice from Sept. 13 to Sept. 18, 1954.

Reports will be made on the following subjects:—Antibiotics in Endodontics; Metal, Acrylic, and Tooth Grafts to support Protheses; Conclusions and Suggestions for Social-medical Defence of Caries.

Besides reports and communications, numerous practical demonstrations are on schedule, particularly useful to professional men. An Exhibition of books and magazines, medical material, and products in the field of dentistry will be organized on the Congress premises.

After the opening, which will take place on Monday, Sept. 13, at 9.30 a.m., in the "Sala dello Scrutinio", in the Ducal Palace, participants will visit the "Fondazione Cini" in the Island of S. Giorgio.

Scientific sittings will take place at the Civil Hospital in the "Sala Capitolare" of St. Mark's School.

For information, application, and forwarding of reports please apply to the Secretary, Dr. R. Sambo, Civil Hospital, Venice.

BOOK REVIEWS

COMPLETE DENTURES. By MERRILL G. SWENSON, D.D.S., F.I.C.D., F.A.D.P., Third edition. $6\frac{3}{4} \times 9\frac{1}{4}$ in. Pp. 735 + xv, with 882 illustrations. 1953. London: Henry Kimpton. 101s. 6d.

THE very fact that this book has reached its third edition is sufficient evidence of its merit.

This edition differs little from the second. It is nine pages longer, resulting from the inclusion of some information on the assessment and handling of the over-fastidious and unreasonable patient, and the addition of a short description of mucostatic impressions.

Some minor alterations have been made in the lay-out of the book, and Chapter IV, dealing with the vertical dimension, has been revised to bring it more into line with present-day thought.

There are no additional illustrations and the bibliography, although large and well arranged, has received few, if any, additions since the last edition.

In some places the text has been clarified by additional sub-headings in bold type.

The book is divided into five sections. The first section is devoted to the consideration and elucidation of the basic underlying principles of denture design and construction. It includes, among many other things, the general approach to the patient, anatomy and physiology in relation to denture design, the underlying principles of impression taking, jaw relationship, and occlusion.

The author then proceeds to a detailed consideration of step by step technique, applying the previously considered basic principles to the construction of complete dentures, immediate dentures, and single maxillary dentures.

This method of handling the subject has much to commend it, as it enables theory to be grasped before technique is considered, and it prevents any chapter becoming unwieldy.

On the whole, the text is simple and clearly written, but occasionally a plethora of detail tends to cloud the issue.

The book is very well illustrated. There are 882 figures, the majority being half-tone plates, and they have all been chosen and photographed with great care to illuminate the text.

Complete Dentures is a book which should be read by every conscientious practitioner of prosthetics, as it is full of sound facts and contains much to stimulate thought.

It is a pity that such prominent mention of mucostatic impressions is made in the preface and then only a very cursory consideration of them is given in the book; and that plaster-of-Paris, surely the primary mucostatic impression material, is only mentioned in passing.

K. P. L.

THE ADMOR FEES RECKONER. Devised by K. W. ADAM, L.D.S. R.C.S. Eng. On single sheet of glazed carding. 1954. Bognor Regis: K. W. Adam, 29 London Road. 7s. 6d.

IN a busy practice a lot of mistakes may be made and time consumed in adding up the numerous fees for a list of amalgams and silicates under the National Health Scheme. This ready reckoner will undoubtedly help in avoiding these mistakes. The card will give the total fees by an easy cross-reference system. If, for instance, seven amalgams are done at £1 2s. 6d. each, and four at 15s., then the total fee for all the amalgams is given as £10 17s. 6d. Figures for all types of treatment are worked out, and it will probably save a lot of time and worry to the secretary in the practice.

N. L. W.

MAXILLO-FACIAL LABORATORY TECHNIQUE AND FACIAL PROSTHESES. By STANLEY BRASIER, Chief Technician, Prosthetic Laboratory, Plastic Surgery, Burns and Jaw Injury Centre, St. Lawrence Hospital, Chepstow, Mon. With a Foreword by SIR WILLIAM KELSEY FRY, C.B.E., M.C. $6 \times 9\frac{5}{8}$ in. Pp. 232 + xii, with 292 illustrations. 1954. London: Henry Kimpton. 31s. 6d.

THIS new text-book should be read by all who are interested in maxillo-facial work.

It is unique in scope, well presented, well illustrated, and interesting beyond its own special sphere.

To the technician it is essential in describing accurately all the cases with which he is likely to be presented and shows him many new and recognized methods of work. The dental surgeon will appreciate the mechanical work entailed and thus be able to streamline his own technique. The senior student by studying this branch will improve his routine practical work, and also gain valuable knowledge for his final examinations. R. F. C. T.

ABSTRACTS
from Other Journals

Vitamin K for Dental Hæmorrhages

The following answer was given to a question regarding vitamin K being given as a prophylactic against dental hæmorrhages—when it should be given, the preparation advised, and the dosage.

Vitamin K is only indicated when the prothrombin activity has been diminished by liver damage, obstructive jaundice, malabsorption (in some cases), anticoagulant therapy with coumarin derivatives, and long-continued salicylate therapy. It is naturally of no value in dental hæmorrhage due to other causes, such as scurvy or purpura. If there is no urgency it can be given orally as acetomenaphthone, 20 mg. daily, for two or three days before the extraction. Should there be any urgency, however, it should be given parenterally; intramuscular injection is painful, so 20 mg. of a water-soluble preparation should be given intravenously.—ANY QUESTIONS (1954), *Brit. med. J.*, **1**, 168.

Facial Disfigurement after Dental Extractions

Following the answer to the question on facial disfigurement after dental extractions, a reader now writes to say that he thinks the vertical lines referred to were not the nasolabial groove but the fine furrows running vertically down to the vermilion edge of the lips. These are due to loss of skin elasticity and muscle tone; they are never seen in the young even with full or no dentures, and are only exaggerated in the elderly by inadequate restoration of contours by the dentist. He considers that 'plumping' is useless, and the only mitigation possible is the placing of the tips of the artificial incisors as far forward as natural appearance permits. Some sacrifice of function is permissible to obtain the lip eversion required, and stability is surprisingly little interfered with.—NOTES AND COMMENTS (1954), *Brit. med. J.*, **1**, 224.

Acrodynia due to Teething Powders

Teething powders have been given to infants since a very long time. With the present-day knowledge it has now been possible to show that they are dangerous to life. The mercury in them has been incriminated as an important aetiological factor in nephrosis and in pink disease. In pædiatrics and in pædodontics the aim should be to interfere as little as possible with the course of nature where normal processes are concerned. At present about 75 per cent give gripe-water and teething powders from the second month of life. This is proved to be quite unnecessary as the teeth will continue to erupt at their own rate with or without causing symptoms and completely unaffected by any form of therapy.

Administration of any mercurial preparation to infants is full of dangers, as shown in this article.—DATHAN, J. G. (1954), *Brit. med. J.*, **1**, 247.

Cancer of the Tongue, Mouth, and Pharynx

A statistical survey of cancer of the tongue and mouth is presented. The object of this survey is to demonstrate, by separate sex analysis of the comparative results of treatment of cancer of the mouth and tongue, that such results not only can exist, but may be substantial.

It is shown that in females the over-all treatment results are much higher, and that post-operative mortality, recurrence rate, and

incidence of secondary lymph-nodes are lower. The sex ratio, male to female, of the total cases in tongue and buccal cavity respectively is almost identical, but there are marked differences between individual sites. In women the disease manifests itself at an earlier age than is the case in men.

Statistical figures are set out under eight tables, under the following headings:—

1. Data for investigation.
2. Comparison by sex of 10-year survival rates.
3. Comparison by sex and clinical findings of 10-year survival rates.
4. Comparison by sex and age of post-operative mortality.
5. Comparison by sex and clinical findings of post-operative mortality.
6. Comparison by sex of incidence of primary recurrence in node-free group.
7. Comparison by sex of incidence of cervical lymph-nodes before treatment.
8. Comparison by sex of development of cervical lymph-nodes in cases originally node-free.—RUSSELL, MARION H. (1954), *Brit. med. J.*, **1**, 430.

The Effect of Barbiturates on Dental Stimuli

In a study of the effects of barbiturates with and without added analgesics, the data so far collected show no statistical significance.

However, there appears to be a tendency for a rise in the pain threshold in patients to whom pentobarbital sodium 1½ gr. and a combination of acetylsalicylic acid 5 gr. and pentobarbital sodium 1½ gr. was administered 30 min. before testing.—LINDAHL, R. L. (1953), *J. Dent. Child.*, **20**, 115.

Treatment of Fractured Anterior Teeth in the Young Patient

Radiograph all fractured incisors to ascertain any root fracture.

If the fracture involves the enamel alone, smooth fracture surface, and keep a close watch for possible death of the pulp.

If the fracture involves dentine, make stainless steel band for tooth to maintain zinc oxide dressing on exposed dentine, and leave for six months before removing.

Restore broken surface with three-quarter crown having porcelain or plastic window.

If the fracture involves the pulp, perform an immediate partial amputation of the pulp and restore with appropriate means.—LAWRENCE, K. E. (1953), *J. Dent. Child.*, **20**, 125.

Arthroplasty of Jaw

Increasing difficulty in opening the jaw leads to a gradual diminution of intake of food requiring mastication. This will lead to malnutrition, and bilateral operation then becomes a life-saving procedure. The degrees of ankylosis as measured by the gape between incisor teeth on opening the mouth could be from less than ¼ in. to less than 1 in. Although operations can be successful in the majority, complications, such as paresis of frontalis and torn external auditory meatus, can be experienced. Bone graft may be necessary, where instability is created following bilateral condylectomy.—BUXTON, ST. J. D. (1954), *Ann. R. Coll. Surg. Engl.*, **14**, 18.

Clinical Study of the Forces required to dislodge Maxillary Denture Bases of Various Designs

The variables considered were compressive and non-compressive impression techniques, post-dam, peripheral seal, relief area, area of contact (presence or absence of palatal area and of buccal and labial flanges). Force was applied at various points perpendicular to plane of base-plate. Maximum force applied was 192 oz. (5500 g.), limited by pain and possibility of excessive distortion of the base-plate. No significant difference could be associated with impression technique. For all the base-plates less force was necessary if applied toward the posterior margin, which may be related to leverage and to this being the area of maximum processing distortion. Plates 1 and 2 extended over the normal denture-bearing area. Retention was increased by the addition of peripheral seal and post-dam—the latter being more effective—and reduced by relief area. Plate 3 lacked labial and buccal flanges, the area of contact being reduced 25 per cent thereby. With this

baseplate, and also with No. 4, forces below the limit of 5500 g. were always effective. Readings were erratic, suggesting a stabilizing function of the missing flanges. Addition of post-dam improved the retention much less than addition of peripheral seal. Plate 4 lacked the palatal portion, the area being reduced by 25 per cent, and was the least effective of all. Addition of peripheral seal improved retention only when combined with post-dam.—SKINNER, E. W., CAMPBELL, R. L., and CHUNG, P. (1953), *J. Amer. dent. Ass.*, **47**, 671.

Some Clinical Observations regarding the Role of the Fluid Film in the Retention of Dentures

Reference is made to conflicting earlier reports on the role of adhesion, cohesion, atmospheric pressure, and surface tension. In the present study, salivary secretion was inhibited by the administration of $\frac{1}{50}$ gr. atropine sulphate and comparisons made of the forces required to dislodge base-plates with the fluid film present and absent. Zinc oxide/eugenol and alginate impressions were used, no variation being detected referable to the impression technique. In every case, the absence of the film increased the required dislodging force. It is tentatively suggested that a very thin film might in fact remain, in which case the values in Staniz' expression $F = \frac{2CA}{a}$ would be very high.—CAMPBELL, R. L. (1954), *J. Amer. dent. Ass.*, **48**, 58.

Some Psychological Aspects of Denture-stimulated Gagging

Three cases are reported in which denture-stimulated gagging was found to be associated with well-marked neurosis. In the first, the gagging and a reiterated demand for an implant denture were explained as arising from the patient's elevation of the dentist into a deified authoritarian symbol, and the demand for an implant denture as reflecting guilt emotions. The second patient was an obsessive, and displayed symptoms of regarding the loss of his teeth as a threat to his ego. The third patient was much younger, and his difficulties with his denture were interpreted as representing an identification with and antagonism to his mother, who had similar difficulties. In the first and third cases there was a significant family history.—COLLETT, H. A., and BRIGGS, D. L. (1953), *J. pros. Dent.*, **3**, 665.

Masticatory Pressures exerted with Implant Dentures as compared with Soft-tissue-borne Dentures

A case is reported of a female patient, aged 41, for whom implant dentures were provided there being a history of persistent pain on mastication for three years since the loss of the teeth. Four sets of full upper and lower dentures had been provided in that time. Bimeter measurements gave readings of 10 lb. pressure up to the limits of comfort. Provision of lower implant dentures resulted in an increase of the tolerable pressure to 64 lb., the limit being set by pain in the anterior part of the upper jaw. With the provision of upper implant denture, the tolerable pressure rose to 73 lb.—KNOWLTON, J. P. (1953), *J. pros. Dent.*, **3**, 721.

DENTAL BOARD OF THE UNITED KINGDOM

The Board will meet in public session for general business at 12 noon on Wednesday, May 12, 1954.

S.I.M.A. (Dental Laboratories Section)

AT the Summer Conference to be held on Saturday, June 19, 1954, at the Chamber of Commerce, New Street, Birmingham, the morning sessions will be devoted to the Reception, Reports and other business of the Association. At 2.30 p.m. the following Lectures will be given:—"Vacuum Investing and Hygroscopic Expansion of Investment Materials", by Mr. M. E. Aspin, F.I.B.S.T.; "Acrylic Eye Implants", by Mr. A. Gardiner, L.I.B.S.T. Both lectures will be illustrated by specimens and colour films.

The afternoon meeting will be open to all who are interested; tickets may be obtained on application to Mr. G. Taylor, 310 Ridgacre Road, Quinton, Birmingham.